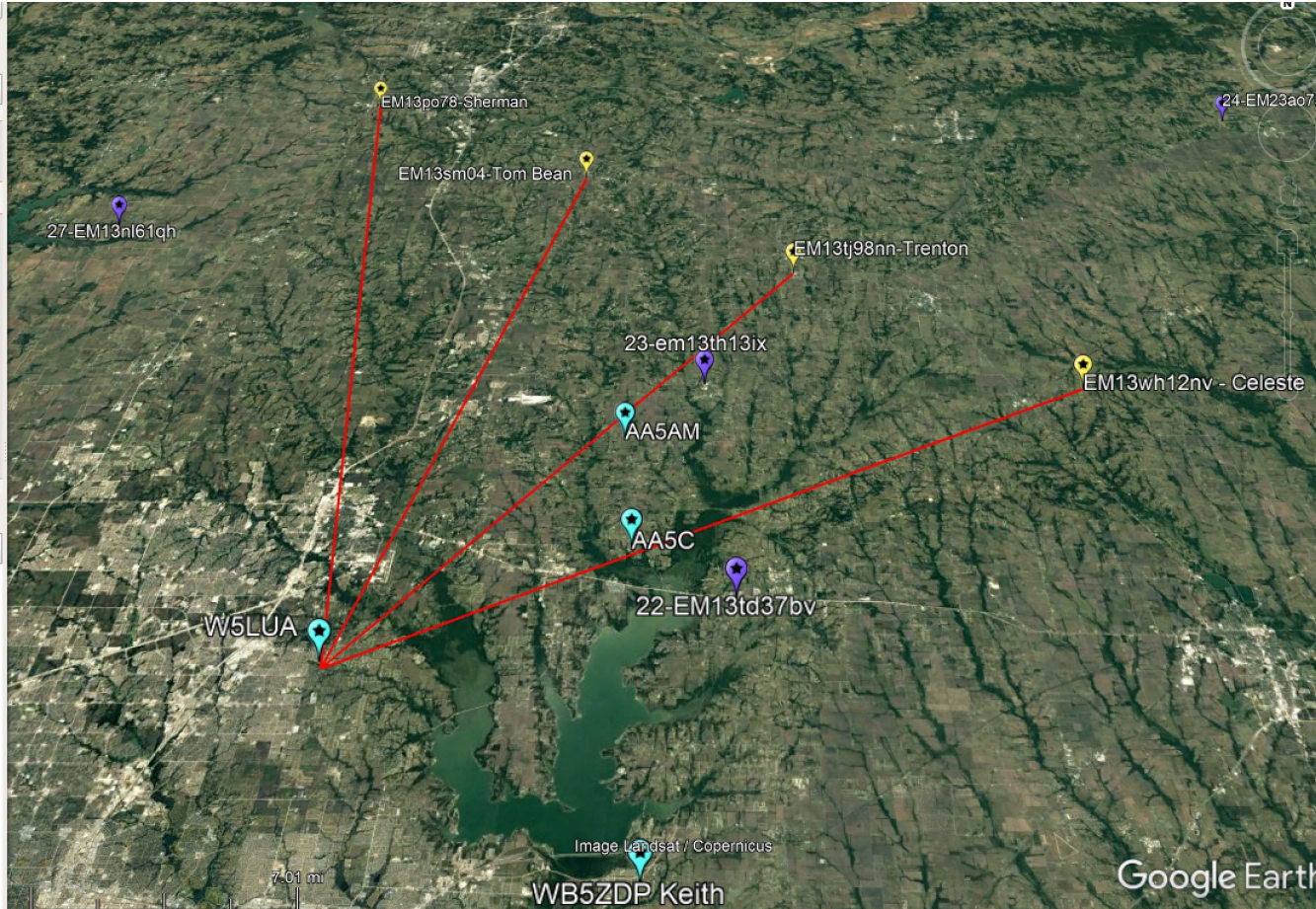
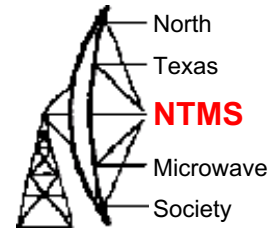


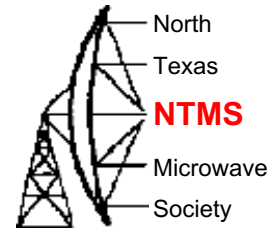
# KM5PO

24 GHz shakedown &  
location checkout  
Oct. 30, 2022

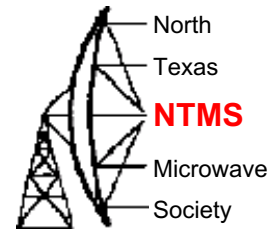
# Location plan



# The 10 GHz LO problem is back



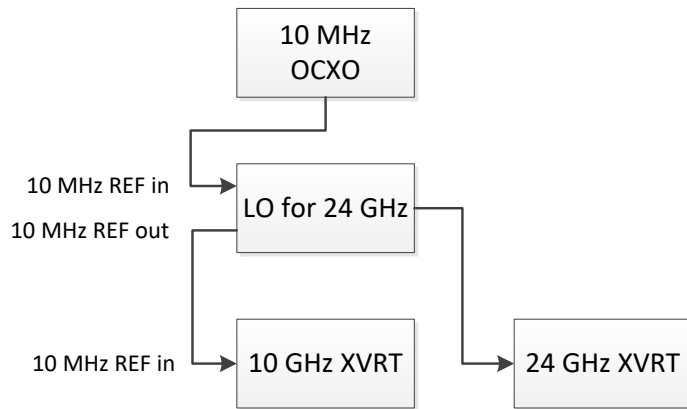
# 10 GHz LO problem



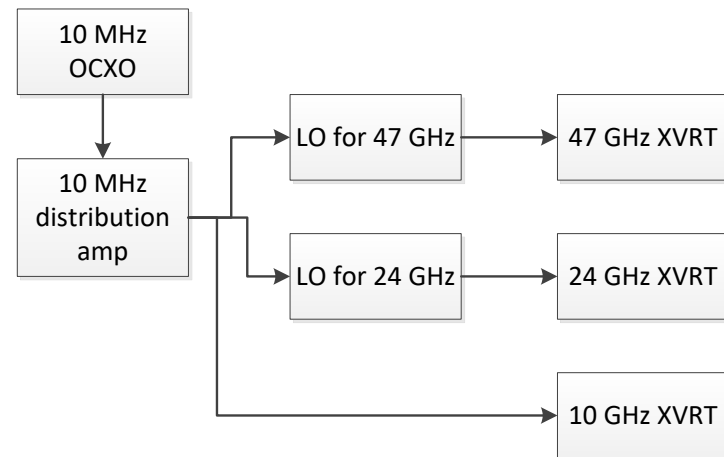
- OCXO power level too low causing loss of lock every 1.5 minutes
- Annoying on receive and transmit
- Decided to ask for dashes to be sent on 10 GHz, peak up dish then switch to 24 GHz.
- The fix to the problem (day after roving): Identify input ref required for lock on 10 GHz transverter (> 7dBm).
- Implement 10 GHz distribution system to amplify and make plenty of 10 GHz reference available for all transverters on rover platform.

# Before & After

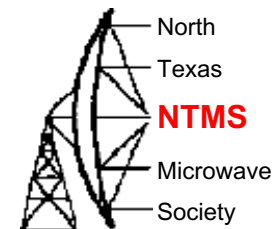
## Did not work well



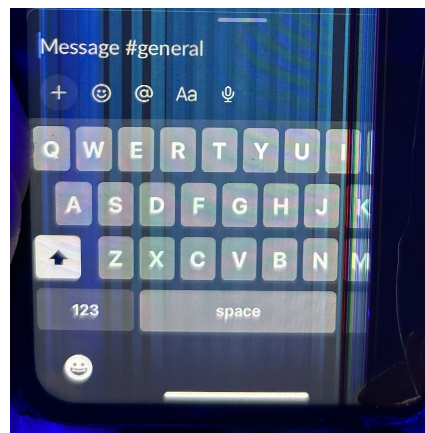
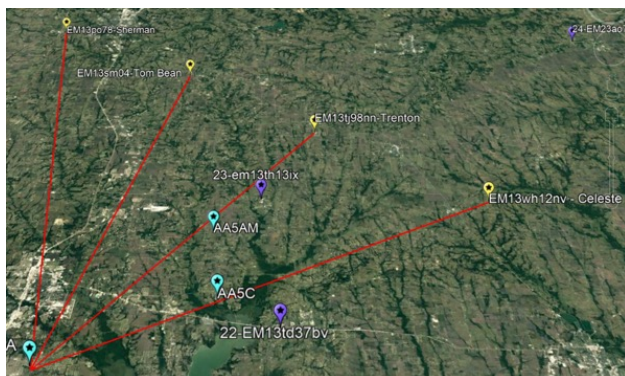
## Better design



# Results



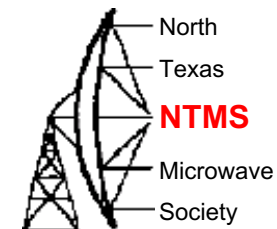
		W5LUA		AA5C		AA5AM	
Location		EM13qc68il		EM13se55wi		EM13sg54mf	
City	Grid	DX	Status	DX	Status	DX	Status
Celeste TX	EM13wh12mv	49km	24 GHz	31km	DNT	28km	24 GHz
Trenton TX	EM13tj98nn	42km	24 GHz	27km	24 GHz	19km	24 GHz
Tom Bean TX	EM13sm04ip	45km	DNT	37km	DNT	29km	DNT
Sherman TX	EM13po78gu	56km	DNT	53km	DNT	45km	DNT



Cell phone became unusable which brought an end to the testing

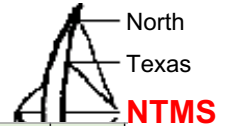
Start bringing 144 MHz along on roving to use a backup

# Data collection



- Recall 122 GHz propagation paths highly dependent on weather conditions (earlier this year KM5PO – KI5EMN testing and others worldwide)
- Paul Perryman stated that weather data points along intended laser paths would be collected and analyzed prior to deployment.

# Data collection



NTMS

Microwave Society

1. Determine paths - record to **PATHMASTER**

MKEY	SEQ	Active?	Owner	Description	Start Date	Start Time	Duration	Interval
10	10	A	JIM	W5LUA to Celeste	10/30/2022	10:30	2:00	0:15
20	10	A	JIM	W5LUA to Trenton	10/30/2022	10:30	2:00	0:15
30	10	A	JIM	W5LUA to Tom Bean	10/30/2022	11:00	2:00	0:15
40	10	A	JIM	W5LUA to Sherman	10/30/2022	11:00	2:00	0:15
50	10	A	JIM	W5LUA to WQ5S @ W5FKN	10/30/2022	8:00	6:00	0:15

2. Determine points on paths - record to **PATHPOINT**

MKEY	PSEQ	Active?	City	State	Zip
10	10	A	Allen	TX	
10	20	A	Princeton	TX	
10	30	A	Merit	TX	
10	40	A	Celeste	TX	

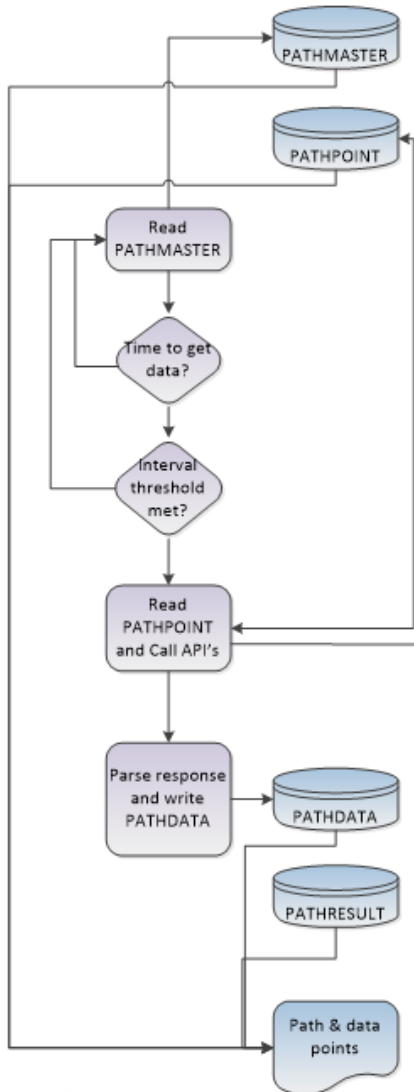
3. Batch process is triggered on time thresholds

Key	Seq	Street	Point City	State	Station	Station City	OBS TS	LAT	LONG
10	10	1123 Bel Air	Allen	TX	D8356		2022-11-05 14:04	33.097	-96.693
10	20	3624 CR 413	Princeton	TX	AP096	Melissa	2022-11-05 13:56	33.18012	-96.498
10	30	14082 CR 673	Merit	TX	E9433	Blue Ridge	2022-11-05 14:01	33.21678	-96.2875
10	40	1239 CR 1069	Celeste	TX	F7718	Greenville	2022-11-05 14:05	33.29428	-96.1947

4. Batch process calls APIs based on **PATHPOINT** - writes **PATHDATA**

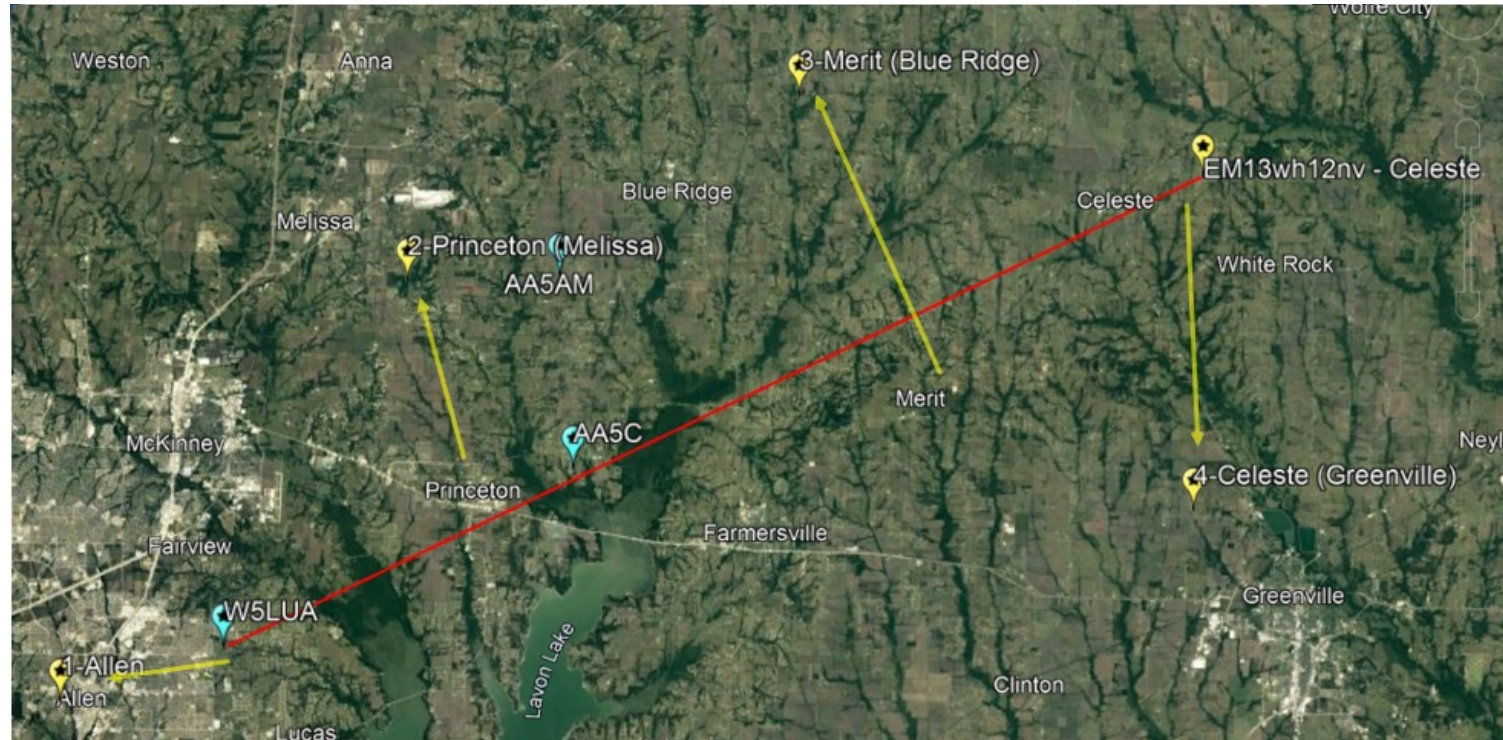
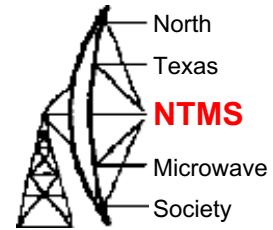
Temp	Dew P	Rel Hum	Pressure	Sea Lvl P	Vis	Cloud %	Wind Dir	Wind Sp	Wind Gu	Precip	Snow
6.1	3.9	88	990.5	1015.7	15	0	278	1.9	4.1	0	0
6.1	3.9	86	993.5	1014.6	16	0	269	2.6	5.0	0	0
6.1	3.9	86	990.5	1014.8	16	0	283	3.5	6.8	0	0
7.2	4.9	87	991.0	1015.1	16	0	294	3.8	6.6	0	0

5. Test results manually logged to **PATHRESULT** - report is run for analysis

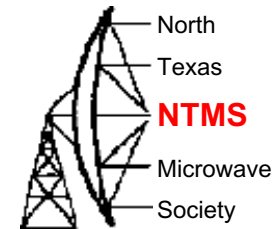




# API station selection

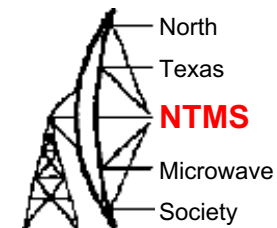


# API response



```
{
  "count": 1,
  "data": [
    {
      "app_temp": 21.7,
      "aqi": 18,
      "city_name": "Merit",
      "clouds": 96,
      "country_code": "US",
      "datetime": "2022-11-04:21",
      "dewpt": 19.9,
      "dhi": 89.68,
      "dni": 761.36,
      "elev_angle": 26.23,
      "ghi": 419.65,
      "gust": 9.953125,
      "h_angle": 45,
      "lat": 33.21678,
      "lon": -96.28748,
      "ob_time": "2022-11-04 21:17",
      "pod": "d",
      "precip": 1.1739697,
      "pres": 979,
      "rh": 94,
      "slp": 1001.6256,
      "snow": 0,
      "solar_rad": 90.9,
      "sources": [
        "rtma"
      ],
      "state_code": "TX",
      "station": "E9433",
      "sunrise": "12:47",
      "sunset": "23:31",
      "temp": 21.1,
      "timezone": "America/Chicago",
      "ts": 1667596661,
      "uv": 0.95145404,
      "vis": 0,
      "weather": {
        "description": "Light rain",
        "code": 500,
        "icon": "r01d"
      },
      "wind_cdir": "S",
      "wind_cdir_full": "south",
      "wind_dir": 187,
      "wind_spd": 2.6987057
    }
  ]
}
```

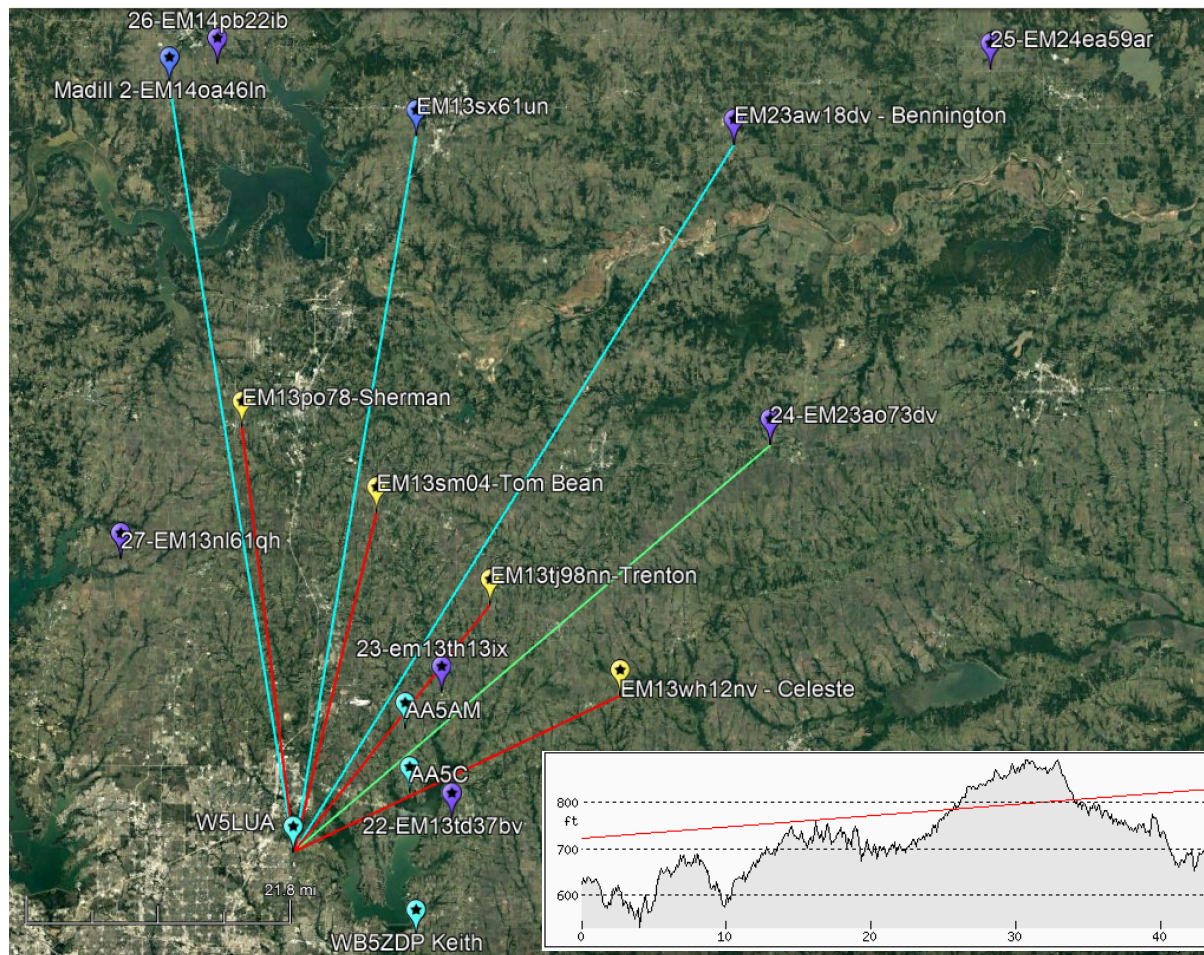
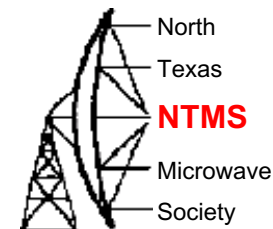
# Round two



		W5LUA		AA5C		AA5AM		PATHDATA points									
Location		EM13qc68il		EM13se55wi		EM13sg54mf											
City	Grid	DX	Status	DX	Status	DX	Status	City	Zip	City	Zip	City	Zip	City	Zip	Other	
Celeste TX	EM13wh12mv	49km	24 GHz	31km	DNT	28km	24 GHz	Allen	75002	Princeton	75407	Merit	75442	Celeste	75423	km5po	weatherbox
Trenton TX	EM13tj98nn	42km	24 GHz	27km	24 GHz	19km	24 GHz	Allen	75002	Princeton	75407	Blue Ridge	75424	Trenton	75490	km5po	weatherbox
Tom Bean TX	EM13sm04ip	45km	DNT	37km	DNT	29km	DNT	Allen	75002	Melissa	75454	Anna	75409	Tom Bean	75489	km5po	weatherbox
Sherman TX	EM13po78gu	56km	DNT	53km	DNT	45km	DNT	Allen	75002	Weston	75097	Dorchester	75459	Sherman	75090	km5po	weatherbox

- Try same target locations again
  - If conditions are favorable, then potentially expand DX
- Run data collection system
  - Test collected data for reasonableness from multiple sources
  - Integrate improvements if needed
- Look for correlations between data collected and results of tests
- Possibly integrate pressure/temperature aloft data
- Bring on 47 GHz – winter/spring 2023
- Renew 122 GHz testing – winter 2023

# Expanded DX targets



# Questions?

